

**TABLE AP1-4. MAGAZINES (EARTH-COVERED AND ABOVEGROUND) AND CONTAINERS WITH REDUCED NEWS AND/OR REDUCED QD
May 2010**

DRAWING NO. (NOTE 1)	DRAWING DATE	DESCRIPTION	DESIGNER	APPROVAL DATE	MAGAZINE DESIGNATION	MAGAZINE MCE (pounds of HD 1.1)	COMMENTS:	NOTES:
422-15-01	1-Jun-87	RC, 3-Compartment Mini-Magazines	COE	4-Mar-88	7-Bar	425	There is no reduced ESQD associated with this ECM design.	
422-15-02	21-Feb-96	RC, 3-Compartment Mini-Magazines	COE	28-Sep-98	7-Bar	150	When NEW described on approval letter are met, this ECM can be sited for overpressure (K40) only.	
422-15-03	21-Feb-96	RC, 3-Compartment Mini-Magazines	COE	28-Sep-98	7-Bar	400	When NEW described on approval letter are met, this ECM can be sited for overpressure (K40) only.	
A-1 (K9 Explosive Storage Facility)	10-May-94	RC shell with an internal steel magazine	AF (Hanscom AFB)	7-Apr-95	Undefined	18	Magazine designed by 66th Support Group, Hanscom AFB, MA., for the storage of explosives training aids used in SPS Detector Dog Training Kits.	2
Magazine design designated by AF-NGB as ANG-DWG-87-095	N/A	Steel Arch	AF-NGB	9-Apr-90	Undefined	150 or 450	Known as the Ellington ECM (40 ft by 80 ft). The design was approved under Site Plan ANG Ellington ANGB-85-S1 and S-2.	3
Magazine design designated by AF-NGB as ANG-DWG-87-112	N/A	Steel Arch	AF-NGB	9-Apr-90	Undefined	150 or 450	Known as the Fresno ECM (40 ft by 80 ft). The design was approved under Site Plan NGB-Fresno-85- S3 thru S6.	3
Magazine design designated by AF-NGB as ANG-DWG-89-115	N/A	RC Arch	AF-NGB	7-Aug-89	Undefined	150 or 450	Known as the Fargo ECM (40 ft by 80-ft). Approved under Site Plan ANG Fargo-88-S1 thru S-5 Hector Field, Fargo, ND.	3
Magazine design designation by AF-NGB as ANG-DWG-94-001	N/A	RC Arch	AF-NGB	29-Jul-94	Undefined	425	This design provides construction details for both a 26-foot X 66-foot ECM and a 30-foot by 60-foot ECM containing 5 barricaded cells. The design was approved under Site Plan NGB Des Moines ANG 91-S1 thru S6.	4
Magazine design designated by AF-NGB as ANG-DWG-94-002	N/A	RC Arch	AF-NGB	29-Jul-94	Undefined	425	This is a 40 foot X 80 foot ECM containing 8 barricaded cells. The design was approved under Site Plan ANGRC-Dannelly-93-S1 thru S7.	4
Magazine design designation by AF-NGB as ANG-DWG-96-001	N/A	RC Arch	AF-NGB	23-Dec-96	Undefined	425	This is a 40 foot X 80 foot ECM containing 8 barricaded cells. AF-NGB has restricted this design from new construction.	4
Magazine design designated by AF-NGB as ANG-DWG-99-001	N/A	Steel Arch	AF-NGB	13-Sep-99	Undefined	425	This is a 26 foot X 60 foot ECM containing 3 barricaded cells.	4
Magazine design designated by AF-NGB as ANG-DWG-00-001	N/A	Steel Arch	AF-NGB	30-Sep-02	Undefined	425	This is a 26 foot X 60 foot ECM containing 4 barricaded cells.	4

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40mm Ammunition Storage	See Comments	Earth covered 55 gallon drum or corrugated steel pipe	USATCES	7-Nov-07	ECM	5	Constructed of either a steel 55-gallon drum or a 35-inch length of 24-inch diameter, 16-gage corrugated steel pipe, with the magazine top and sides covered by at least two feet of earth or sandbags. Use for M430 40 mm linked grenades or Hazard Division 1.4s small arms ammunition. The HD 1.4S small arms ammunition may be stored by itself, or in conjunction with the M430 grenades. The M430 grenades will be stored in either the PA 120 or M548 can. The magazine will be constructed as shown in Joint Munitions Command, Army Peculiar Equipment, drawings ACV00819-1 through 8. The QD with a front barricade is 69 feet. Without a front barricade, the QD is 69 feet out the sides and rear and 452 feet out the front. Refer to DDESB-PD Memorandum of 7 November 2007 for additional conditions and limitations.	
Blasting Cap Carrying Box	UNK	Metal box	NRL-USRD	12-Mar-92	AG	N/A	Capable of fully containing effects from initiation of up to five blasting caps. The ESQD is 0 feet when the container is closed.	
Canine Training Aid Explosive Storage Magazine (CETASM)	See Comments	Sand-filled cannisters in a metal box	NOSSA	27-Jul-07	AG	1.25	NOSSA is responsible for maintaining the CETASM design drawings and specifications as well as the technical report NAWCWD TP 8615, "Limited Arc Magazines for Military Working Dogs, Magazine Tests Final Report," (April 2006). The container is constructed by Armag Corporation per drawings KP00001.01, revision 1, dated 2/22/07; drawing number C-00001.01, revision 1, dated 7/31/06; drawing number C-00003.01, revision 0, dated 8/3/05; drawing number C-00004.01, revision 1, dated 7/31/06; and drawing number C-00005.01, revision 1, dated 7/31/06. The maximum allowable NEW in the CETASM shall be 87.5 lbs HD 1.1. The IB distance is 25 feet, PTR distance is 15 feet, IL distance of 12 feet, and IM distance is 4 feet. Subsequent to the initial approval, DDESB on 14 November 2008 approved the modification of the blank container that is inserted into a slot not containing any explosives samples. Refer to DDESB approval memos for additional conditions and limitations.	
Class 5 Mosler Security Container	N/A	High security, heavy duty, file cabinet	NCEL	23-Feb-93	AG	0.3	This container is approved for full containment of an internal explosion involving up to 0.3 pounds NEW of HD 1.1. Approval is based on the condition that the cabinets being used are equivalent in strength to the Mosler safe design that was evaluated by NCEL in 1983.	
CONEX, HAZMAT, MILVAN, AND ISO CONTAINER STORAGE	N/A	Metal box	USADAC &USABRL	6 Feb 92, mod 6 May 96	AG	500	Approved for storage of bulk explosives and demolition charge material (i.e.composition C-4, TNT, etc.) and select HD 1.3 and 1.4 materials. If conditions are met, a 360-foot ESQD is permitted.	5
Use of Shipping Containers as ECM	N/A	Metal box, earth- covered	USADAC & Huntsville COE	22-May-95	Undefined ECM	4,000 kg/8,800 lbs	Concept for converting shipping containers (e.g., MILVANS and ISO) into undefined ECM was evaluated. Since the skin of the container cannot support 2 feet of earth cover, three alternate methods are identified in USADACS memo SMAC-EST (385[A]) dated 10 Feb 1995, subject: Analysis of Earth-Covered Shipping Containers as Earth-Covered Magazines (ECM), for providing the required earth cover on and around the container. No reduction in QD is permitted.	
Container Blasting Cap: MK-663 MOD 0	5206195 thru 520620	Capped steel pipe	NAVSEA SYSCOM	DOT approved	AG	5 grams (0.011 lbs.)	A Schedule 40 seamless steel pipe 4 1/2 inches outside diameter by 8 1/2 inches long, tightly capped on each end with Schedule 40 steel pipe caps. Refer to latest revision of DOT-SP 9571 at http://www.phmsa.dot.gov/hazmat/regs/sp-a/special-permits . When packed in this container, explosives can be shipped as HD 1.4S.	

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Explosive Ordnance Disposal Ready Service Locker (EODRSL)	NAWS China Lake Drawings 104- 001 through 104-004	Metal box	Navy	27-Mar-98	AG	0.625	This design was developed by NAWC Weapons Division, China Lake. It uses a modified off-the-shelf Sam Nally magazine to provide additional venting and seven special pumice-lined containers to limit the MCE in the magazine to 0.625 pounds NEW. A 30-foot clear area is required around the EODRSL, within which no permanent personnel are permitted. NAWC China Lake Test Report NAWCWPNS TM 7979 defines all conditions and modifications associated with use of the EODRSL. On 25 Oct 2000, the DDESB approved the addition of an eighth pumice-lined container for the storage of no more than 10 explosives-loaded enhanced 1.5 liter Mineral Water Bottle (MWB) tubes and/or standard 1.2 liter MWB tubes. The MCE remains unchanged.	
Advanced EOD Magazine	ARMAG Corporation Drawing 72000 (21 sheets)	Metal box	Navy	27-Feb-01	AG	1.25	This design was developed by NAWC Weapons Division, China Lake, for Air Force EOD, which had a need for a deployable explosives storage magazine with a minimal ESQD. This design uses a modified off-the-shelf ARMAG Corporation magazine to provide additional venting and 17 special pumice-lined containers (for storage of HD 1.1 and 1.3 AE) to limit the MCE in the magazine to 1.25 pounds NEW of C-4. HD 1.4 items are stored within metal containers on the internal expanded metal shelves. The maximum NEW permitted in the magazine is 128.24 pounds. An Air Force EOD kit contains approximately 254 pounds NEW, therefore two of these magazines are required to hold the EOD kit. A 10-foot clear area is required around the Advanced EOD Magazine, within which no permanent personnel are permitted. NAWC China Lake Test Report NAWCWD TM 8331 defines all conditions and modifications associated with use of the Advanced EOD Magazine.	
Explosives storage building	N/A	RC Box	COE	10-Sep-93	AG	50	Approved for 1.1 and 1.3 bulk explosives and HD 1.4 ammunition. The ESQD is 147 feet and is based on overpressure (K40) only. A front barricade is required to stop the structures front panel and door.	
Explosives storage building	N/A	RC Box	COE	10-Sep-93	AG	100	Approved for HD 1.1 and 1.3 bulk explosives and HD 1.4 ammunition. The ESQD is 186 feet and is based on overpressure (K40) only. A front barricade is required to stop the structures front panel and door.	
Explosives storage building	N/A	RC Box	COE	10-Sep-93	AG	200	Approved for HD 1.1 and 1.3 bulk explosives and HD 1.4 ammunition. The ESQD is 234 feet and is based on overpressure (K40) only. A front barricade is required to stop the structures front panel and door.	
Explosives storage building	N/A	RC Box	COE	10-Sep-93	AG	300	Approved for HD 1.1 and 1.3 bulk explosives and HD 1.4 ammunition. The ESQD is 268 feet and is based on overpressure (K40) only. A front barricade is required to stop the structures front panel and door.	
2-Bay Explosives Storage building	N/A	RC Box	NCEL	1988 (undated memo)	ECM	250	This design, as described in NCEL TM 51-86-27, Basis of Design for PE 500R, Ammunition Magazine Mountain Warfare Training Center, Bridgeport, CA, is for a two bay ECM that is front barricaded. The MCE is 250 lbs HD 1.1 (lightly cased), the contents of one bay, since IMD is met between bays. The allowable QD with a front barricade is 320 feet. If the front barricade is not provided, the frontal QD will comply with DoD 6055.9-STD criteria.	
Explosive Containment Device (ECD)	Covered by U.S. Patent 6,196,107 B1	Metal Box filled with rigid polyurethane foam	Samples of Dry Primary Explosives" by Harold K.H.	Patent approval - 6 Mar 2001	AG	5 lbs TNT	The ECD measures roughly 78 inches long x 48 inches high X 34 inches wide. Designed to fully contain an explosives event involving up to 5 lbs. TNT or equivalent. Initially designed for the FAA as a bomb containment vessel to complement luggage screening operations, it is suitable for other applications as well. A paper on the ECD was given at the 26th DDESB Seminar in Orlando, FL. The DDESB is currently awaiting the documentation package for review.	

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GOLAN 5 Protectainer	N/A	Metal cylindrical vessel with elliptical heads, both ends	Israeli company (see comments)	2-Oct-02	AG	11 lbs TNT Equivalent material	Refer to the DDESB approval memo for restrictions and conditions associated with the use of the GOLAN 5. Manufactured by Koors Metals Ltd of Israel. The U.S. distributor is Mistral Security, Inc. NAVFACENGCOM maintains the design drawings and specifications for this container. The GOLAN 5 Protectainer is designed to contain/limit explosion effects from an internal detonation of 11 lbs (5 kg) TNT equivalent explosives. It has an internal fragment defeating liner, but it has munition diameter limitations associated with it. Internal pressures are vented slowly through 2 vents in the bottom and around the door. The reduced QD are 30 feet IBD, 20 feet PTRD, and 10 feet ILD. IMD requirements provided by DDESB memo.	6
GOLAN 10 Protectainer	N/A	Metal cylindrical vessel with elliptical heads, both ends	Israeli company (see comments)	9-Jun-04	AG	23 lbs	Refer to the DDESB approval memo for restrictions and conditions associated with the use of the GOLAN 10. Manufactured by Koors Metals Ltd of Israel. The U.S. distributor is Mistral Security, Inc. NAVFACENGCOM maintains the design drawings and specifications for this container. The GOLAN 10 Protectainer is designed to contain/limit explosion effects from an internal detonation of 23 lbs (10.43 kg). It has an optional internal fragment defeating liner, but it has munition diameter limitations associated with it. Internal pressures are vented slowly through a small vent in the bottom and around the door. Previously, required QD were 30 feet IBD, 20 feet PTRD, and 10 feet ILD. Based on subsequent testing, the DDESB approved reduced QD of 3 feet IBD, PTRD, and ILD. IMD requirements are provided by DDESB memo.	6
Military Working Dog Training Aids Storage ECM	N/A	Metal box in an earth-covered RC box	NFESC	8-May-91	Undefined	17.9	This ECM has a reduced QD of 105 feet (maximum fragment throw). Two storage concepts were approved and these are described in NCEL TM Number 51-91-03. Default distances apply if a front barricade is not provided.	8
Modular Ready Magazine (MRM)	UNK	RC Box, with internal non-propagating walls	NFESC	31-Jul-97	Undefined	500	The allowable NEW for each of the five bays in the MRM is 500 pounds HD 1.1. The internal non-propagating walls limit the MCE to 500 pounds NEW. The ESQD associated with this ECM design is 1,250 out the front and 700 feet for the sides and rear. Constructed at MCAS Kaneohe Bay.	9
Multiple Round Container (MRC)	UNK	SS Tube with welded/bolted end caps	Office of the Product Manager for Non-Stockpile Chemical Materiel (PMCD)	16 June 2006/16 Nov 2007	AG	See Comments	The DDESB has approved two designs (7" by 27" and 9" by 41") of the multiple round container (MRC) for non-propagation storage of chemical rounds containing bursters (but no fuzes) with zero (0) QD. The containers are approved for explosively configured RCWM with NEW less than or equal to 105mm M60. The application of chemical arcs still must be accomplished. Refer to the DDESB memorandums for additional considerations/limitations.	
NABCO SV-23	N/A	Metal cylindrical vessel with elliptical heads, both ends	NABCO, Inc.	21-Dec-01	AG	22	Refer to the DDESB approval memo for restrictions and conditions associated with the use of the NABCO SV-23. Manufactured by NABCO, Inc., of Pittsburgh, PA. The SV-23 is designed to contain/limit explosion effects from an internal detonation of 23 lbs NEW of HD 1.1. The SV-23 is available in two models, one with a fragment defeating liner and one without. Both designs have munition diameter limitations associated with them. Internal pressures are vented slowly through 2 vents in the top and around the door. The reduced QD are 5 feet IBD, 5 feet PTRD, and 2 feet ILD. IMD requirements provided by DDESB memo.	7
NABCO SV-23 (Increased NEW)	N/A	Metal cylindrical vessel with elliptical heads, both ends	NABCO, Inc.	10-Apr-03	AG	32	Through additional testing, NABCO, Inc. demonstrated that the SV-23 had the capability to contain explosion effects from 32 lbs (plus a 25% additional test charge). Based on the results of testing, the DDESB approved the SV-23 for a larger NEW quantity. QD were modified accordingly. Refer to the DDESB approval memo for restrictions and conditions associated with the use of the NABCO SV-23 for storage of explosives quantities up to 32 lbs NEW. The reduced QD are 15 feet IBD, 15 feet PTRD, and 5 feet ILD. IMD requirements provided by DDESB memo.	7

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NABCO SV-50	N/A	Metal cylindrical vessel with elliptical heads, both ends	NABCO, Inc.	16-Apr-04	AG	50	Refer to the DDESB approval memo for restrictions and conditions associated with the use of the NABCO SV-50. Manufactured by NABCO, Inc., of Pittsburg, PA. The SV-50 is designed to contain/limit explosion effects from an internal detonation of 50 lbs NEW of HD 1.1. The design has munition diameter limitations associated with it. Internal pressures are vented slowly through 2 vents in the top and around the door. The reduced IBD and PTR are 20 feet to the front and sides, which transitions to a 5-foot IBD and PTRD to the rear. IMD requirements provided by DDESB memo.	7
NABCO SV-80	N/A	Metal cylindrical vessel with elliptical heads, both ends	NABCO, Inc.	23-Mar-09	AG	80	Through additional testing, NABCO, Inc. demonstrated that the SV-50 had the capability to contain explosion effects from 80 lbs (plus a 25% additional test charge). Based on the results of testing, the DDESB approved the SV-50 for a larger NEW and QD were modified accordingly. Refer to the DDESB approval memo for restrictions and conditions associated with the use of the NABCO SV-80. The reduced IBD and PTRD arc is in the shape of a baseball field and measures 35 feet (ft) to the front, 35 ft to the sides (measured from the center of the door), and 10 ft to the rear. The required ILD is 15 ft to the front and sides of the entrance of the SV-80 vessel and 5 ft to the rear. IMD requirements are given in the DDESB memo.	
NABCO Portable Total Containment Vessel (PTCV)	N/A	Metal cylindrical vessel with elliptical heads, both ends	NABCO, Inc.	18-Jun-04	AG	2.25	Refer to the DDESB approval memo for restrictions and conditions associated with the use of the NABCO PTCV. Manufactured by NABCO, Inc., of Pittsburg, PA. The PTCV is a dual-vessel containment system approved for containment of an internal detonation of 2.25 lbs NEW of non-primary fragment producing HD 1.1 (e.g., bulk explosives). After explosives are placed into the PTCV, a lever attached inner vessel is rotated 180 degrees in order to seal off the opening. Pressures from an internal detonation are slowly released from around the door seal. The IBD, PTR, ILD, and IMD is 3 feet.	
Non-Propagating Explosives Storage Cabinet	N/A	RC Box, earth-covered	Bartles, presented at the 12th Symposium of Explosives	UNK	ECM	5 lbs TNT	Sandia National Laboratories (SNL), Albuquerque, working with New Mexico Engineering Research Institute (NMERI), developed a design for a non-propagating explosives storage cabinet capable of preventing propagation to an adjacent cabinet for 5 lbs TNT. The design was to be incorporated into ECM housing 20 such cabinets (2 rows with 10 back-to-back) with the MCE remaining 5 lbs NEW. A maze is provided to stop the door and other debris and to attenuate blast effects. A description of the development program and testing results can be found in Sandia Report SAND90-1906, dated August 1991, "Development of a Non-Propagating Explosives Storage Cabinet." Due to insufficient data, the default QD will need to be used, until such time as additional information is made available.	
Prosser/Enpo Containment Magazine	UNK	Metal box	AF	1-May-89	AG	N/A	An aboveground metal magazine capable of completely containing fragments from an explosion involving up to 1,000 DUPONT E-117 detonators when stored in the defined configuration. The ESQD is based on blast only. Use of this magazine was approved for a DCMA contractor who was unable to meet a 670-foot ESQD requirement.	
Protectainer Model DROR- 1	N/A	Metal box	Israeli company (see comments)	25-Jun-98	AG	1.1	Manufactured by Koors Metals Ltd of Israel. The U.S. distributor is Mistral Security, Inc. Called the Protectainer Model DROR-1 and is designed to fully contain the hazardous effects from the detonation of 1.1 pounds HD 1.1. Approved by the DDESB on a site approval for Building 568, Room 8, at Fort Detrick, MD (U.S. Army Technical Center for Explosives Safety, SIOAC-EST File Number 1258), and on a site approval for the TAIL Laboratory at the Detroit Arsenal (approval dated 18 Nov 99). Contact U.S. Army TCES for information. The ESQD for this container was specifically defined by the approval letters for the rooms they were sited in.	

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Prototype, Non-propagation 40 mm HEDP Storage Container	N/A	Aluminum box with pumice separated slots for M433 grenades	NWC China Lake	UNK	AG	one M433 grenade	This design was developed by NWC China Lake for Eglin AFB in 1989. The effort involved developing an aluminum, pumice-filled container that would hold M433 grenades and prevent the propagation of one grenade to the remaining grenades in the box. Testing, described in NWC TP 7029, August 1989, proved out the concept, but a DDESB approval memo has not been found yet. This entry is to make Services aware of this work, in the event they might have additional information about this work.	
Ready Service Magazine (C-2748)	22-Jun-87	RC Box	MCLB Albany	10-Apr-87	Undefined	20	Constructed at Marine Corps Logistics Base, Albany, GA, in accordance with local Drawing C-2748. ECM has internal dimensions of 5-foot square. A front barricade is required for application of a reduced ESQD. The ESQD is 110 feet, and PTRD is 65 feet. Explosives must be kept a minimum of 1-foot from walls and ceiling.	
Ready Storage Magazine for various grenades in pumice-filled containers	N/A	Metal box	Navy	8-Apr-93	AG	One grenade	This aboveground magazine was developed for storage of 40mm M433 HEDP Grenades, M67 Fragmentation Grenades, and MK3A2 offensive hand grenades in specially-designed pumice-filled containers, placed inside a specific, modified Sam Nally magazine. Conditions of 8 Apr 93 DDESB letter must be met. NAWC-WPNS TM 7263, dated February 1992, provides test and design criteria for the pumice containers and the magazine. Maximum credible event is one grenade. The grenade containing the largest NEW is the MK3A2 which contains 0.5 pounds of explosives. The ESQD for this magazine is 0 feet.	
Shipping Container for Transportation of Small Samples of Dry Primary Explosives	N/A	6-inch X 12 to 14-inch Schedule 80 Seamless Pipe with 6-inch dia. Malleable iron end caps	NAVSEA SYSCOM	DOT approved	AG	25 grams (0.055 lbs.)	This shipping container is rated for explosive or pyrotechnic material, including waste containing explosives that has energy density not significantly greater than that of pentaerythritol tetranitrate. Refer to the latest version of DOT-SP 8451. When packed in this container, treat contents as 1.4E.	
Shipping Container for Transportation of Small Samples of Dry Primary Explosives	N/A	4-inch X 14-inch Schedule 80 Seamless Pipe with 4-inch dia. forged steel end caps	NAVSEA SYSCOM	DOT approved	AG	25 grams (0.055 lbs.)	This shipping container is rated for explosive or pyrotechnic material, including waste containing explosives that has energy density not significantly greater than that of pentaerythritol tetranitrate. Refer to the latest revision of DOT-SP 8451. When packed in this container, treat contents as 1.4E.	
Shipping Container for Transportation of Small Samples of Dry Primary Explosives	N/A	Metal box	Los Alamos National Laboratory	DOT approved	AG	15 grams (0.033 lbs.)	Model LD-1000 explosive or pyrotechnic material, including waste containing explosives that has energy density not significantly greater than that of pentaerythritol tetranitrate. Refer to the latest version of DOT-SP 8451. When packed in this container, treat contents as 1.4E.	10
Shipping Container for Transportation of Small Samples of Dry Primary Explosives	N/A	Metal box	Los Alamos National Laboratory	DOT approved	AG	25 grams (0.055 lbs.)	Model LD-2250 rated for explosive or pyrotechnic material, including waste containing explosives that has energy density not significantly greater than that of pentaerythritol tetranitrate. Refer to the latest version of DOT-SP 8451. When packed in this container, treat contents as 1.4E.	10
Shipping Container for Transportation of Small Samples of Dry Primary Explosives	N/A	Metal box	See comments	DOT approved	AG	25 grams (0.055 lbs.)	The device described in "Handling Procedure and Design of a Shipping Container for Transporting Small Samples of Dry Primary Explosives" by Harold K.H. Bartles, presented at the 12th Symposium of Explosives and Pyrotechnics on March 13, 1984 in San Diego, California, USA. Rated for explosive or pyrotechnic material, including waste containing explosives that has energy density not significantly greater than that of pentaerythritol tetranitrate. Refer to the latest version of DOT-SP 8451. When packed in this container, treat contents as 1.4E.	11
Small Explosives Magazine, TYPE I	91-11-1F through 91-11-3F	Metal box	NCEL	12-Mar-92	AG	1	The ESQD is 20 feet. Intraline distance is 12 feet. Operational requirements are contained in NCEL TM M-51-91-07, dated Feb 91.	

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Spherical Shields	N/A	Metal containers of various shapes and dimensions	and Pyrotechnics on March 13, 1984 in San Diego, California, USA	See Comments	AG	See Comments	A suppressive shield is a vented, steel enclosure, which is capable of controlling or confining the hazardous blast, fragment, and flame effects of internal detonations. There are 8 Groups of suppressive shields that have been developed and approved by the DDESB, and these are described in paragraph 6.3. Allowable NEWs range from 2,000 lbs to approximately 1 lb. Some of these shields, such as the Group 6A and 6B, will provide full containment of effects, while others had specific goals of providing very high levels of personnel protection at less than the required default separation distances.	

Notes accompanying Table AP1-4:

1. Each line represents a separate magazine design. Where UNK appears in the table, it indicates that no information was found for that particular entry.
2. The ECM's shell is constructed of 8-inch thick RC. A 1/4-inch thick steel magazine with wood lining is placed inside the RC shell. The ECM must have 38-inches of earth cover, and the sides of the earth cover must have a 2:1 slope. Explosives must be stored two feet from the magazine walls. The ECM has a reduced IBD arc of 92 feet and a PTRD arc of 55 feet. A front barricade is required.
3. Approved for up to 450 pounds NEW HD 1.1. An IBD arc of 250 feet applies to the sides of these ECM. A 700-foot IBD arc applies to the front sector of these ECM, with one exception. When the MCE is 150 pounds of HD 1.1 or less, a 500-foot IBD arc can be used from the front sector of these ECM. The front sector of the ECM is defined by angles of plus and minus 15 degrees, drawn normal to the door.
4. Approved for a maximum of 425 pounds NEW HD 1.1 of Sensitivity Group (SG) 1 through 4 per cell as permitted by DDESB-KT memo of 30 September 2002, subject: Approval of Multi-Barricaded Storage Cell, Magazine Design ANG-DWG-00-001. The conditions and restrictions established for ANG-DWG-00-001 also apply to ANG-DWG-94-001, ANG-DWG-94-002, ANG-DWG-96-001, and ANG-DWG-99-001, ANG-DWG-00-001. Those designs all have layouts that provide for multiple internal cells, separated by sand-filled (2.5 feet sand thickness) Styrofoam walls (Blast Tamer). Those internal walls prevent prompt propagation thereby allowing the ECM's MCE to remain the largest explosive quantity in one cell, not to exceed 425 lbs. An IBD arc of 250 feet applies from the sides of these ECM. A 700-foot IBD arc applies from the front sector of these ECM, with one exception. When the MCE is 150 pounds of HD 1.1 or less, a 500-foot IBD arc can be used from the front sector of these ECM. The front sector of the ECM is defined by angles of plus and minus 15 degrees, drawn normal to the door. When SG 5 munitions are placed inside any cell, a minimum of 3 feet of sand is required to separate the SG 5 from munitions in adjacent cells. A layer of sandbags can be used to augment the existing Blast Tamer wall in order to obtain the additional sand thickness requirement.
5. The concept for using a container express (CONEX) container, as an explosives storage container for certain mixed munitions, is described in Quickload Program Technical Data Package (TDP), dated 25 Nov 91, and was issued by the U.S. Army Ballistic Research Laboratory, Aberdeen Proving Grounds, MD. The TDP lists the specific item that can be stored in these containers. Use of a sandbag barricade between CONEX containers allows them to be stored at IMD of 8 feet, allowing the MCE and QD to be based on a single container. Subsequently, DDESB approval was obtained to permit storage of these same AE items in hazardous material (HAZMAT) containers, Military-owned Demountable Containers (MILVAN), and International Organization for Standardization (ISO) containers. Specific container dimensions

apply to the approval and must be met. CONEX containers shall have internal dimensions of 92" long by 72" wide by 70" high, 0.125" thick corrugated steel walls and floor. HAZMAT containers shall have internal dimensions of 222" long by 126" wide by 84" high, 0.100" thick corrugated steel floor and 0.125 thick epoxy-coated plywood deck. MILVAN containers shall have internal dimensions of 232" long by 90" wide by 85" high, 0.0787" thick corrugated steel walls and a hardwood floor. ISO containers shall have internal dimensions of 231" long by 92" wide by 92" high, 0.0787" thick corrugated steel walls and a hardwood floor.

- *6. The GOLAN 5, 10, and 15 manufactured by Mistral Security, Inc., are approved for storage of fragmenting munitions with diameters up to 1.6 inches (40mm) and explosives materials weighing up to 11 lbs TNT equivalent explosives (GOLAN 5), 23 pounds NEW (GOLAN 10), and 33 lbs NEW (GOLAN 15). The use of NEW with the GOLAN 10 and 15 is intentional and results from testing at 125% of the rated TNT equivalence capacity of 23 lbs and 33 lbs, respectively, with minimal damage to the container. A minimum internal standoff for explosives from the nearest inside wall apply (19 inches for the GOLAN 5, 23 inches for the GOLAN 10, and 29 inches for the GOLAN 15). The minimum IMD from a GOLAN container to another exposed explosives site (acting as an ES) is based on K1.25. The minimum IMD from any PES that does not totally contain blast hazards to an ES GOLAN container shall be based on K6. Use of these containers will be in accordance with DDESB approval memorandums. Refer to DDESB approval memorandum for specific requirements for each GOLAN design.
7. The SV-23, increased NEW SV-32, and SV-50, manufactured by NABCO Inc., are approved for storage of fragmenting munitions with diameters up to 1.6 inches (40mm) and explosives materials weighing up to 23, 32, and 50 pounds NEW, respectively. A minimum internal standoff distance for explosives separation from the nearest inside wall is required (24 inches for the SV-23, and 30 inches for the increased NEW SV-23 and SV-50). Refer to DDESB approval memorandum for specific requirements for each SV version.
8. Two storage concepts have been approved. The first storage concept consists of 12-inch reinforced masonry walls with a RC roof and floor slab and 3 feet of earth cover. A metal storage locker is located within the cavity. The second storage concept uses railroad ties to form the walls and roof of the structure. Three feet of earth are required on top of this structure. A metal storage locker is located within the cavity. A front barricade is needed with both concepts.
9. The MRM is a five-cell ECM designed to store one, loaded AERO 51 trailer in each cell. The only ordnance items permitted within the cells are MK50 Torpedoes; GM Tactical Penguin; Sonobuoy HE, SSQ-110; GM Tactical Maverick; Bomb, GP MK 82; Bomb, GP MK 83; Bomb, Rockeye MK 20; MK 46 Torpedo (MK 103 Warhead); and GM Tactical Harpoon Missile. Other limitations are: the maximum height from the floor of any ordnance item is 6.5 feet; a 1.5-foot separation distance is required between weapon and walls; a stand-off of 1-foot is required from the floor; bombs

cannot be fuze while in MRM storage; and the Maverick and MK 50 Torpedo (directed energy weapons) must be oriented so that their directed effects are towards the front or back wall of the MRM. The BOD of the MRM, constructed at Marine Corps Air Station (MCAS) Kaneohe, HI, is found in NFESC Technical Report TR-2056-SHR, May 96.

10. Construction of Models LD-1000 and LD-2250 is described in "Shipping Containers for Small Samples of High Explosives" by Richard A. Hildner and Manual J. Urizar, Los Alamos National Laboratory Report No. LA-9107-MS/UC-71, Hercules Incorporated's application, dated January 14, 1993.
11. Construction of this shipping container is described in "Handling Procedures and Design of a Shipping Container for Transportation of Small Samples of Dry Primary Explosives" by Harold K.H. Bartles, presented at the 12th Symposium of Explosives and Pyrotechnics on March 13, 1984 in San Diego, CA.